

# Extending Movement Derivations from Control to Binding\*

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In Takano (2010) I proposed that certain facts about scrambling and pronominal variable binding in Japanese provide a new argument for the movement theory of (obligatory) control proposed and defended by Hornstein (1999, 2001) and others. The crucial fact leading to this conclusion is that the presence of a control relation between an element in the matrix clause and the subject of the complement clause makes it possible for otherwise unacceptable binding relations to be created by long-distance scrambling. In this work I also note (Takano 2010: 90-91) that it is a control relation, and not a binding relation, that causes this effect. Thus, the same effect cannot be seen if we replace the control complement by a finite complement whose subject has a pronoun bound by the matrix element. These observations, if correct, not only support the movement theory of control but also argue against the movement approach to binding advocated by Hornstein (2001) and Kayne (2002), illustrated in (1b) for the example in (1a).

- (1) a. John<sub>i</sub> thinks that he<sub>i</sub> is smart.  
 b. John thinks that <John> he is smart (<John> = unpronounced copy of *John*)

According to the movement approach to binding, the binding relation in (1a) is analyzed as arising from movement of the antecedent from the position of the pronoun, as shown in (1b).<sup>1</sup> My proposal thus implies (2).

- (2) Binding, unlike control, cannot involve movement of the antecedent.

In this paper, I consider this point more carefully and show that the crucial fact that leads to (2) receives an account independent of the issue in question and that with a suitable control, the presence of a

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<sup>1</sup> There are two major proposals about what exactly happens in the subject of the embedded clause in (1b). Hornstein (2001) assimilates it to obligatory control, claiming that *John* is merged directly into the subject  $\theta$ -position of the embedded clause and moves from there, with its copy spelled out as the pronoun *he*. Kayne (2002) proposes an alternative in which *he* and *John* get merged first to form a constituent and this constituent is merged into the embedded subject position, and then *John* moves out of this constituent. The choice between the two alternatives is irrelevant to the present discussion and I will remain neutral on this issue.

binding relation does cause exactly the same effect as the presence of a control relation. Therefore, I conclude, contrary to my proposal in Takano (2010), that the relevant facts do indeed support the view that binding, like control, should be treated in terms of movement of the antecedent.

## 1 Evidence for Controller Movement: Takano 2010

Let us begin by reviewing the discussion in Takano 2010. There I examined closely the effect of Japanese long-distance scrambling (i.e., scrambling out of a clause) establishing new binding relations and put forward a previously unnoticed empirical generalization. I then proposed an account of this generalization that relies crucially on the movement theory control.

In Japanese, there is a well-known asymmetry between clause-internal scrambling and long-distance scrambling with respect to whether they can establish new binding relations (see Saito 1992 and Tada 1990, 1993, among others, for relevant discussion; see also Mahajan 1990 for the same facts in Hindi). Thus, in (3a), where the subject contains a pronominal, *soko*, to be bound by a QP in the object, the intended bound variable interpretation for the pronominal given in (3c) is impossible.

- (3) a. \**Soko*<sub>i</sub>-no            *sotugyoosei*-ga    *mittu-izyoo*-no    *daigaku*<sub>i</sub>-ni    *syutugansita*.  
          it-GEN            graduate-NOM    three-or.more-GEN    university-DAT    applied  
          ‘Their graduates applied to three or more universities.’

- b. *Mittu-izyoo*-no    *daigaku*<sub>i</sub>-ni    *soko*<sub>i</sub>-no    *sotugyoosei*-ga    *syutugansita*.  
          three-or.more-GEN    university-DAT    it-GEN    graduate-NOM    applied

- c. There are three or more *x*, *x* a university, such that someone who graduated from *x* applied to *x*.

However, the bound variable interpretation becomes possible if the object QP undergoes scrambling to the front of the sentence, as in (3b). For the sake of discussion, let us assume that a pronominal can receive a bound variable interpretation only if it is c-commanded by a QP. This condition is not met in (3a), but it is in (3b), due to scrambling. The improved status of (3b) indicates that Japanese clause-internal scrambling has the effect of making bound variable interpretations possible.

The same property is not shared by long-distance scrambling. The example in (4a) shows that a pronominal contained in the subject of the matrix clause cannot be bound by a QP in the object of the embedded clause. This fact is parallel to the one in (3a). However, scrambling the embedded object to the front of the matrix clause does not make the bound variable interpretation possible, as shown in (4b), even though it brings the QP to a position c-commanding the pronominal. This fact is in sharp contrast to the fact with clause-internal scrambling in (3b).

- (4) a. \**Soko*<sub>i</sub>-no            *sotugyoosei*-ga    *Aya*-ni            [*Ken*-ga            *mittu-izyoo*-no  
          it-GEN            graduate-NOM    *Aya*-DAT            *Ken*-NOM            three-or.more-GEN  
          *daigaku*<sub>i</sub>-ni            *syutugansita*            to]            itta.  
          university-DAT    applied            that            told  
          ‘Their graduates told Aya that Ken applied to three or more universities.’

- b. \**Mittu-izyoo*-no    *daigaku*<sub>i</sub>-ni    *soko*<sub>i</sub>-no    *sotugyoosei*-ga    *Aya*-ni  
          three-or.more-GEN    university-DAT    it-GEN    graduate-NOM    *Aya*-DAT

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	it-GEN	graduate-NOM	Ken-DAT	three-or.more-GEN	university-DAT
	syutugansuru yoo(ni)]		susumeta.		
	apply	C	recommended		
	‘Their graduates recommended to Ken that he apply to three or more universities.’				
b.	?*Mittu-izyoo-no	daigaku <sub>i</sub> -ni	soko <sub>i</sub> -no	sotugyoosei-ga	Ken-ni
	three-or.more-GEN	university-DAT	it-GEN	graduate-NOM	Ken-DAT
	[PRO	syutugansuru yoo(ni)]		susumeta.	
	apply	C	recommended		

The examples in (7) differ minimally from those in (6): in (6) the DP containing a pronominal is an object of the matrix clause, whereas in (7) it is a subject of the matrix clause. But long-distance scrambling of the embedded object QP in (7b) does not help the QP bind the pronominal contained in the matrix subject, in contrast to the situation in (6b).

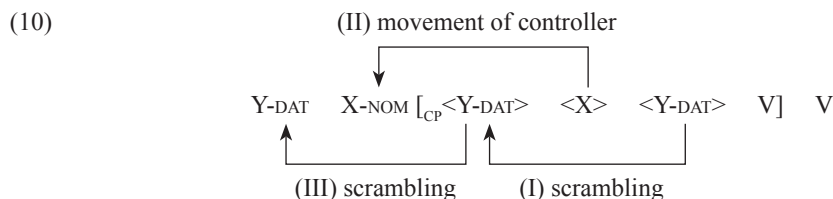
Note that the pronominal is contained in the controller in (5) and (6), but not in (7). Capitalizing on this fact, I put forward the new empirical generalization in (8).

- (8) Scrambling out of a control complement clause makes pronominal variable binding possible only if the pronominal is contained in the controller.

I then proposed to derive this generalization by making the claims in (9).

- (9) a. Scrambling out of a control complement clause, just like scrambling out of a finite complement clause, does not license variable binding.  
b. Pronominal variable binding in (5b)/(6b) is licensed inside the complement clause.  
c. Obligatory control is derived by movement of the controller (movement theory of control).

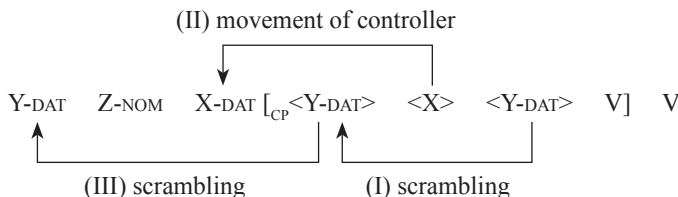
This proposal works as follows. Let us consider the derivation of (5b). Given (9c), the derivation proceeds as illustrated in (10), where X contains a pronominal and Y is a QP.



The first relevant step is scrambling of Y inside the embedded clause. This scrambling puts Y in a position higher than the pronominal contained in X. Assuming a derivational view of binding, on which (A-)binding is licensed in the course of a derivation, we see that the pronominal is bound at this point of the derivation. After this step, the controller X moves to the matrix clause and Y scrambles to the matrix clause, too. Note that given (9a), the latter scrambling has no effects on binding. Therefore, it is essential for Y to bind the pronominal contained in X inside the embedded clause. This is possible only if X originates inside the embedded clause, in accordance with the movement theory of control.

The derivation of (6b) is essentially the same. Consider (11). Here too, X contains a pronominal and Y is a QP.

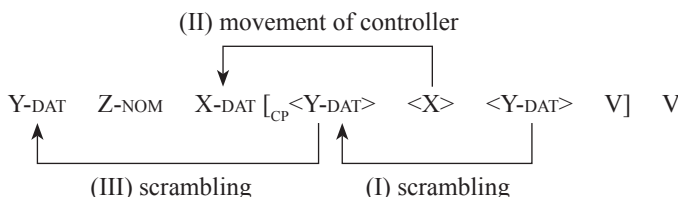
(11)



As in (10), clause-internal scrambling of Y makes it possible for Y to bind the pronominal contained in X, which originates in the embedded clause under the movement theory of control.

The situation is different in (7b), whose derivation is shown in (12), where Z contains a pronominal and Y is a QP.

(12)



Crucially, clause-internal scrambling of Y has no effects on binding here, simply because the pronominal is contained in Z, which stays in the matrix clause throughout the derivation. Thus, in this case, there is no chance for Y to bind the pronominal at any stage of the derivation.

As is clear, the movement theory of control plays an essential role in this account of the contrast between (5b)/(6b) and (7b). If X in (5b)/(6b) controlled a PRO in the subject of the embedded clause and stayed in the matrix clause throughout the derivation, in accordance with the traditional nonmovement theory of control, there would be no difference between (5b)/(6b) and (7b), unless we introduced ad hoc stipulations. The fact that the analysis proposed in Takano 2010 provides a straightforward account of the facts in question thus argues for the movement theory of control.

## 2 From Control to Binding

Now that we have seen my argument in Takano (2010) in favor of the movement theory of control, let us turn to the issue of the nature of binding. I will argue that, contrary to my original claim, we can extend my argument to binding, thus providing a new empirical argument for the movement approach to binding.

An initial indication toward this conclusion can be seen if we consider cases like (13)

- (13) a.   Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei-ga  
          three-or.more-GEN   university-DAT   it-GEN      graduate-NOM  
          [e                   syutugansuru      koto]-o      kessinsita.  
                          apply                                   C-ACC      decided  
          ‘Their graduates decided to apply to three or more universities.’
- b.   Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei-ga  
          three-or.more-GEN   university-DAT   it-GEN      graduate-NOM  
          [zibun<sub>j</sub>-ga           syutugansuru      koto]-o      kessinsita.  
                          self-NOM           apply                                   C-ACC      decided

The example in (13a) has a phonetically null subject in the embedded clause and is parallel to the example in (5b). In (13a) the embedded object QP has scrambled to the front of the matrix clause and this has the effect of licensing a bound variable interpretation for the pronominal contained in the matrix subject (the same bound variable interpretation is not possible without scrambling of the QP). What is important in this case is the fact that the embedded subject can be the overt (nonlocal) reflexive *zibun*, instead of an empty category, as shown in (13b). Moreover, the availability of the bound variable interpretation for the pronominal remains the same in (13b) (again, the variable interpretation is impossible in (13b) without scrambling of the embedded object QP).

This fact in (13b) is apparently surprising. Recall that scrambling out of a clause has no effects on binding (one of my claims in Takano (2010)). If so, what makes variable binding possible in (13) must be scrambling of the embedded object inside the embedded clause. And scrambling inside the embedded clause helps only if the matrix subject, which contains the pronominal, originates in the embedded clause. This analysis is possible in (13a), where the subject of the embedded clause is phonetically null and hence the sentence is treated as an instance of subject control, receiving the analysis shown in (10). But the same analysis does not carry over to (13b), where the embedded subject is lexically filled.

What the examples in (13) show is that movement effects can be seen not only with a relation between controller and controllee but with a relation between binder and bindee as well. This recommends treating the two relations in the same way. This means that the matrix subject in (13b) has moved from the position of the reflexive. This is exactly what the movement approach to binding claims (see (1b)).

In fact, I claim that movement effects of this kind can be seen quite generally in cases involving binder and bindee. At first sight, however, this does not seem to be the case, as I observed in Takano (2010: 90-91). Let us consider (14), which is slightly modified from an example discussed in Takano (2010).

(14) ?*Mittu-izyoo-no	daigaku <sub>i</sub> -ni	soko <sub>i</sub> -no	sotugyoosei <sub>j</sub> -ga
three-or.more-GEN	university-DAT	it-GEN	graduate-NOM
[pro <sub>j</sub>	syutugansita	to]	itta.
	applied	that	said

‘Their graduates said that they applied to three or more universities.’

In this example, the embedded object QP has scrambled out of a finite clause whose subject is a *pro* bound by the matrix subject containing a pronominal to be bound by the scrambled QP. Note that the pattern of referential dependency between the matrix subject and the embedded subject in (14) is the same as that in the control examples we have seen in (5b) and (6b): in both cases, the embedded subject is bound/controlled by the matrix subject. We may thus well expect (14) to fall under the generalization in (8). However, the example in (14), unlike the control examples, does not permit a bound variable reading for the pronominal. Noting this fact, I suggested in Takano (2010) that the binder-bindee relation, unlike the controller-controllee relation, does not involve movement.

Given the fact in (14), this sounds reasonable. However, it turns out that there is an independent factor that makes it impossible for the pronominal in (14) to receive a bound variable interpretation. Let us consider the example in (15a).

- (15) a. Mittu-izyoo-no      daigaku-ni      Ken-ga  
          three-or.more-GEN      university-DAT      Ken-NOM  
          [Mari-ga              syutugansita      to]              itta.  
          Mari-NOM              applied              that              said  
          ‘Ken said that Mari applied to three or more universities.’
- b. Ken said that there were three or more universities that Mari applied to.  
 (narrow scope of QP)
- c. \*There are three or more universities that Ken said that Mari applied to.  
 (wide scope of QP)

This example is parallel to the one in (14) except that it does not have a pronominal contained in the subject of the matrix clause and does not have a *pro* in the subject of the embedded clause. Thus, (15a) has nothing to do with the issue of a bound variable interpretation. But it still has a QP as an object of the embedded clause. Since quantifiers take scope, there are in principle two interpretive possibilities for the QP in (15a). These two possibilities are given in (15b, c). The difference between (15b) and (15c) is that whereas in (15c) the existence of three or more universities is true to the speaker, in (15b) it is true only in the mind of the matrix subject. (15b) describes a narrow scope reading for the existential quantifier and (15c) a wide scope reading. Of these two possibilities (15a) permits only the narrow scope reading in (15b).

The same is true of the example in (14). (14) is acceptable on the reading on which the pronominal *soko* refers to a place specified in context (in which case *soko* is not bound by the QP). On this acceptable reading, the QP can take only narrow scope. If so, the lack of the bound variable interpretation in (14) does not imply anything about the issue of whether the binding relation between the matrix subject and the embedded subject involves movement of the matrix subject. The reason is that we know independently that variable interpretation is contingent on the scope of quantifiers. Suppose we have a logical form something like (16).

(16)  $x$  thinks that  $\forall x$  | John likes Mary

In (16) the universal quantifier takes scope inside the embedded clause and so  $x$  is outside the scope of the quantifier. As a result,  $x$  cannot be interpreted as a variable bound by the quantifier. There is thus a general condition on variable interpretation to the effect that for an element to be interpreted as a variable bound by a quantifier, the element must fall under the scope of the quantifier. Restricting our attention to pronominal variables, we can assume a condition of the following sort:

(17) A pronominal can be interpreted as a variable bound by a QP only if the pronominal is in the scope of the QP.

This condition on variable interpretation is imposed on logical forms and so it has to be met at LF (the interpretive interface), unlike the determination of the A-binder, which we assume to be carried out derivationally (recall the discussion of (10)).<sup>2</sup> If we look at (14) in this light, we see that the example does

<sup>2</sup> That there is an A-binding condition on variable interpretation independent of (17) can be seen by looking at cases like (i).  
 (i) a. \*His<sub>i</sub> mother called every boy<sub>i</sub>.

not permit a variable interpretation for the pronominal because the sentence does not allow the QP to take scope over the matrix clause. Note that the matrix subject receives a subject  $\theta$ -role in the matrix clause. This means that it has to be interpreted in the matrix clause at LF. This in turn means that the pronominal contained in it cannot be in the scope of the QP at LF, failing to meet the condition in (17). Then the lack of a bound variable interpretation in (14) can be accounted for in terms of (17) and the example has no relevance for the issue of whether the matrix subject has moved from the position of the pro it binds.

This shows that I (Takano 2010) looked at the wrong example to decide on the issue under discussion. To settle the issue, we need to look at cases where a QP generated in the embedded clause can take scope over the matrix clause. Notice that obligatory control constructions do allow such QPs to take wide scope, as we can see in (18a) (subject control) and (18b) (object control).

- (18) a. Mittu-izyoo-no      daigaku-ni      Ken-ga  
           three-or.more-GEN   university-DAT   Ken-NOM  
           [e                    syutugansi-yoo    to]            sita.  
                                   apply-will            that            did  
           ‘Ken tried to apply to three or more universities.’
- b. Mittu-izyoo-no      daigaku-ni      Ken-ga      Mari-ni  
           three-or.more-GEN   university-DAT   Ken-NOM    Mari-DAT  
           [e                    syutugansuru    yoo(ni)]    susumeta.  
                                   apply                    C            recommended  
           ‘Ken recommended to Mari that she apply to three or more universities.’

These examples are ambiguous with respect to the scope of the QP. (18a) can be interpreted as stating (i) that Ken tried to apply to three or more arbitrary universities (narrow scope) or (ii) that there are three or more universities that Ken tried to apply to (wide scope). Similarly, (18b) can be interpreted as stating (i) that Ken recommended to Mari that she apply to three or more arbitrary universities (narrow scope) or (ii) that there are three or more universities that Ken recommended to Mari that she apply to (wide scope). Thus, control complements, unlike clearly finite complements as in (14) and (15a), allow QPs originating in them to take wide scope over the matrix clause.

It turns out that there are also noncontrol complement clauses that allow wide scope. Observe (19).

- (19) a. Mittu-izyoo-no      daigaku-ni      Ken-ga      [Mari-ga      syutugansuru  
           three-or.more-GEN   university-DAT   Ken-NOM    Mari-NOM    apply  
           koto]-o                    nozondeiru/negatteiru.  
           C-ACC                    hope/wish  
           ‘Ken hopes/wishes that Mari will apply to three or more universities.’

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b. \*Who<sub>i</sub> did his<sub>i</sub> mother call?

In these cases, the QP takes scope over the entire clause, hence over the pronoun, but nevertheless the pronoun cannot be interpreted as a variable bound by the QP. A standard approach to this problem is to appeal to a condition to the effect that pronominal variable binding requires pronouns to be A-bound by QPs. This A-binding condition, unlike the scope condition in (17), can be satisfied derivationally (see Takano 2010: sec. 3.3 for more detailed discussion of the two conditions on variable binding).



- b. Ken hopes/wishes that there are three or more universities that Mari will apply to.  
(narrow scope of QP)
- c. There are three or more universities that Ken hopes/wishes that Mari will apply to.  
(wide scope of QP)

The example in (19a) is not a control construction, so that the subject of the embedded clause can be filled freely by a DP that is not coreferential with the matrix subject. Thus, (19a) looks similar on the surface to (15a). However, unlike (15a), (19a) permits wide scope (as well as narrow scope) for the embedded object QP.

The claim that (15a) and (19a) differ in the scope of the scrambled QP can be backed up by looking at facts related to the relative scope of two quantifiers.<sup>3</sup> Compare the two cases in (20).

- (20) a. Mittu-izyoo-no      daigaku-ni      dareka-ga  
three-or.more-GEN    university-DAT    someone-NOM  
[Mari-ga                syutugansita      to]                    itta.  
Mari-NOM                applied                that                    said  
'Someone said that Mary applied to three or more universities.'
- b. Mittu-izyoo-no      daigaku-ni      dareka-ga  
three-or.more-GEN    university-DAT    someone-NOM  
[Mari-ga                syutugansuru      koto]-o                nozondeiru.  
Mari-NOM                apply                C-ACC                    hope  
'Someone hopes that Mari will apply to three or more universities.'

Of interest here is a reading on which the scrambled QP takes scope over the QP in the matrix subject. While this reading is very difficult to obtain in (20a) (thus, it cannot be interpreted as “there are three or more universities that someone said that Mari applied to”), it is much easier in (20b) (which can thus mean “there are three or more universities that someone hopes that Mari will apply to). The contrast follows if the scrambled QP can take wide scope over the matrix clause in (20b), but not in (20a).

Although detailed discussion of factors affecting the availability of wide scope is beyond the scope of this paper, it seems reasonable to link the availability/unavailability of wide scope for QPs originating in the embedded clause to the nature of the embedded clause. Thus, we might link the difference between the embedded clause in (15a) and (20a) and the embedded clause in (18), (19a), and (20b) to the difference between indicative/realis and subjunctive/irrealis, given that the content of the embedded clause is asserted in (15a)/(20a), but not in (18)/(19a)/(20b), where the embedded clause describes an unrealized, hypothetical situation (see Palmer (2001) for discussion of the distinction between indicative/realis and subjunctive/irrealis in terms of the notion of assertion). On this view, subjunctive/irrealis complements allow embedded QPs to take wide scope, whereas indicative/realis complements do not.

Whatever the exact factor(s) that make(s) wide scope available, what is important for present purposes is that we can use examples like (19a), where the QP originating in the embedded clause can take wide scope and satisfy the condition in (17), to see whether binding involves movement. Let us consider (21)

<sup>3</sup> Thanks to Mamoru Saito for bringing this point to my attention.

first.

- (21) ?\*Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei-ga  
 three-or.more-GEN      university-DAT      it-GEN      graduate-NOM  
 [Mari-ga      syutugansuru      koto]-o      nozondeiru.  
 Mari-NOM      apply      C-ACC      hope

‘Their graduates hope that Mari will apply to three or more universities.’

This example does not allow the intended bound variable interpretation for the pronominal, even though it does allow the QP to take scope over the matrix clause, which is evidenced by the fact that (20b) permits the scrambled QP to have scope over the matrix subject QP as well as by the fact that (21) is acceptable on the matrix-scope reading of the QP if *soko* has a discourse antecedent.<sup>4</sup>

Compare now (21) with (22).

- (22) a. Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei<sub>j</sub>-ga  
 three-or.more-GEN      university-DAT      it-GEN      graduate-NOM  
 [pro<sub>j</sub>      syutugansuru      koto]-o      nozondeiru.  
    apply      C-ACC      hope  
 ‘Their graduates hope that they will apply to three or more universities.’  
 b. Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei<sub>j</sub>-ga  
 three-or.more-GEN      university-DAT      it-GEN      graduate-NOM  
 [zibun<sub>j</sub>-ga      syutugansuru      koto]-o      nozondeiru.  
 self-NOM      apply      C-ACC      hope

In (22a) the embedded subject is a *pro* bound by the matrix subject and in (22b) it is an overt reflexive bound by the matrix subject. Interestingly, both examples improve on the example in (21) on the bound variable interpretation.

Moreover, the same effect can be seen if the *pro*/reflexive is placed in an object position. The examples in (23b, c) contrast with the one in (23a).

- (23) a. ?\*Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei-ga  
 three-or.more-GEN      university-DAT      it-GEN      graduate-NOM  
 [Ken-ga      Mari-o      suisensuru      koto]-o      nozondeiru.  
 Ken-NOM      Mari-ACC      recommend      C-ACC      hope  
 ‘Their graduates hope that Ken will recommend Mari to three or more universities.’  
 b. ?Mittu-izyoo-no      daigaku<sub>i</sub>-ni      soko<sub>i</sub>-no      sotugyoosei<sub>j</sub>-ga  
 three-or.more-GEN      university-DAT      it-GEN      graduate-NOM  
 [Ken-ga      pro<sub>j</sub>      suisensuru      koto]-o      nozondeiru.  
 Ken-NOM      recommende      C-ACC      hope  
 ‘Their graduates hope that Ken will recommend them to three or more universities.’

<sup>4</sup> As we have seen, the scrambled QP in (20b) can take scope over the matrix subject QP. On the other hand, the fact in (21) shows that in the same structural context, the scrambled QP cannot bind a pronoun contained in the matrix subject. This contrast indicates an interesting asymmetry between scope taking and binding. Specifically, it indicates that variable binding requires more than scope taking, namely, A-binding. See note 2 and Takano 2010: sec. 3.3.

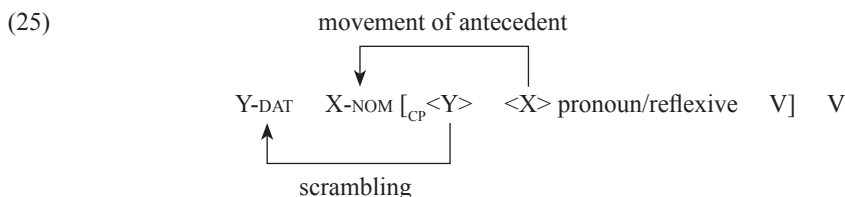
c.	?Mittu-izyoo-no	daigaku <sub>i</sub> -ni	soko <sub>i</sub> -no	sotugyoosei <sub>j</sub> -ga	
	three-or.more-GEN	university-DAT	it-GEN	graduate-NOM	
	[Ken-ga	zibun <sub>j</sub> -o	suisensuru	koto]-o	nozondeiru.
	Ken-NOM	self-ACC	recommend	C-ACC	hope

Thus, the relevant effect can be seen quite generally in cases involving binder and bindee.<sup>5</sup>

Summarizing the results so far, we have seen that the examples in (14) and (21) do not permit a bound variable interpretation for the pronominal contained in the matrix subject, whereas those in (13b), (22), and (23b, c) do. This contrast leads us to the following generalization:

- (24) Scrambling out of a noncontrol complement clause makes pronominal variable binding possible only if (i) the scrambled QP takes scope over the matrix clause and (ii) the pronominal is contained in a DP that binds a pronoun/reflexive in the complement clause.

This generalization follows if binding, like control, involves movement, that is, if the antecedent moves from the position of the pronoun/reflexive it binds. To see this, let us consider the relevant part of the derivations of (13b), (22), and (23b, c) shown in (25), where X contains a pronominal to be interpreted as a variable bound by Y (=QP) and X binds the pronoun/reflexive in the complement clause.



Recalling the analysis in Takano (2010), we see that scrambling of Y out of the complement clause has no effects on variable binding, so Y's binding of the pronominal contained in X must be licensed inside the complement clause. This is possible only if X originates in the complement clause.<sup>6</sup> The examples in (13b), (22), and (23b, c) share the property of having a pronoun or reflexive bound by the matrix subject in the complement clause. Thus, variable binding by Y of the pronominal contained in X can be licensed inside the complement clause under the movement approach to binding, according to which the antecedent X moves from the position of the pronoun/reflexive it binds.

In contrast to the complement clauses in (13b), (22) and (23b, c), the complement clauses in (21) and (23a) do not contain a pronoun/reflexive bound by the matrix subject. As a result, there is no chance for the pronominal contained in the matrix subject to be bound by the QP inside the complement clause.

This discussion makes it clear that movement of the antecedent is indispensable in achieving these results. The contrast between (13b)/(22)/(23b, c) on the one hand and (21)/(23a) on the other cannot receive the same straightforward analysis under the traditional nonmovement approach to binding, where the matrix subject stays in the matrix clause throughout the derivation. Thus, these considerations

<sup>5</sup> The intended bound variable interpretation may be a little worse in (23b, c) than in (22a, b). What matters here is the improvement of (23b, c) over (23a).

<sup>6</sup> If Y is base-generated lower than X, Y first scrambles to a position higher than X inside the complement clause, as in (10)/(11). This step is omitted in (25).

constitute evidence for the movement approach to binding.<sup>7</sup>

### 3 Conclusion

The fact that led me to suggest in Takano (2010) that binding, unlike control, does not involve movement of the antecedent can be explained on independent grounds and therefore does not justify my suggestion. If we look at appropriate cases that avoid this problem, we see that they in fact show the effect of antecedent movement. We thus conclude that facts about scrambling and pronominal variable binding of the kind I explored lend support to the view that control and binding should be treated in the same way, namely, in terms of movement of the controller and antecedent.

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<sup>7</sup> In this paper, I have dealt only with the binding relation between the matrix subject and the pronoun/reflexive in the embedded clause. Questions remain about how to treat another binding relation present in the relevant cases, namely, variable binding by the scrambled QP of the pronominal contained in the matrix subject. How this binding arises is an important question under the movement approach to binding. Under the movement approach to binding, the issue will ultimately receive the same explanation as (i), where the raised DP *everyone* serves as a new binder for the pronoun *his*.

(i) Everyone<sub>i</sub> seems to his<sub>i</sub> mother to be smart.

This is a general issue for the movement approach and I leave it open here for future research.